

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 39

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHANNES MEIER AND URS GABI

Appeal No. 1996-2703
Application 08/339,637

HEARD: February 10, 2000

Before OWENS, LIEBERMAN and KRATZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of claims 11 and 13-21, which are all of the claims remaining in

the application.

THE INVENTION

Appellants' claimed invention is directed toward a process for producing a composite sheet by adhering a layer to a cellular core by use of thermoplastic adhesive applied to both the layer and the cell faces. Claim 11 is illustrative and reads as follows:

11. Process for the production of a composite sheet, which comprises:

applying a thermoplastic adhesive to a cellular core having a plurality of cell faces;

locating the thermoplastic adhesive on the cellular core in the form of drops only on the cell faces;

providing an outer layer;

providing thermoplastic adhesive on the outer layer on the side thereof facing the cell faces of the cellular cores;

feeding the outer layer with said thermoplastic adhesive thereon onto the cell faces of the cellular core; and

bonding said outer layer with said thermoplastic adhesive layer thereon to the cell faces of the cellular core under pressure and at elevated temperature, said bonding step comprising mating said outer layer to said cell faces of said cellular core so that the cellular core thermoplastic adhesive

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and the outer layer thermoplastic adhesive contact each other.

THE REFERENCES

Lynam et al. (Lynam) 1972	3,656,992	Apr. 18,
McKown 1972	3,707,583	Dec. 26,
Goldsworthy 1983	4,420,359	Dec. 13,
Wilson 1981	4,249,974	Feb. 10,
Andresen 1981	4,294,055	Oct. 13,
Trnka 1991	4,990,201	Feb. 5,
Fell 1994 ¹	5,316,604	May 31,
O'Connor 1990	WO 90/14943	Dec. 13,

(PCT application)

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows: claims 11, 17 and 18 over McKown in view of Fell and Lynam; claims 15 and 16 over McKown in view of Fell, Lynam and Andresen; claim 19 over McKown in view of Fell, Lynam and either O'Connor or Goldsworthy; and claims 13, 14, 20 and 21 over McKown in view of Fell, Lynam and either Trnka or Wilson.

¹Continuation of application no. 07/844,547, which is a continuation-in-part of application no. 07/622,253.

OPINION

We have carefully considered all of the arguments advanced by appellants and the examiner and agree with appellants that the aforementioned rejections are not well founded. Accordingly, we reverse these rejections.

McKown discloses a curable structural adhesive in flowable, particulate form which is suitable for adhering layers to honeycomb cores to make aircraft wing assemblies (col. 1, lines 15-16 and 32-35). The adhesive includes 1) an epoxy resin having on average more than one reactive 1,2 epoxy group per molecule, 2) a reaction product of a second epoxy resin and a nitrile rubber copolymer derived from 18-46% by weight of acrylonitrile, 54-82 wt% butadiene, and up to 15 wt% of a carboxylic acid, the second epoxy resin having on average more than one reactive 1,2 epoxy group per molecule, and 3) a curing agent which is stable at room temperature and active at elevated temperatures, wherein the nitrile rubber copolymer is less than about 55% of the combined weight of the first and second epoxy resins and there are enough molecules of the reaction product having a molecular weight of at least 8000 to

comprise at least about 10 wt% of the composition (col. 2, line 69 - col. 3, line 12).

Fell discloses an adhesive for use on the face sheets of honeycomb sandwich panels in applications such as aerospace assemblies (col. 1, lines 17-24). Fell teaches that the curing time of thermosetting resins such as epoxy resins generally is several hours, and that the cycle time for bonding face sheets to honeycomb cores can be reduced to only seconds by use of a thermoplastic adhesive or an adhesive generally containing no more than about 20 wt% thermosetting resin, the remainder being thermoplastic resin (col. 1, lines 23-24 and 33-43; col. 3, lines 15-27; col. 3, line 66 - col. 4, line 2).

Lynam discloses that when honeycomb sandwich panels are made for applications such as aircraft assemblies, forming adhesive fillets at the junctions of the facing panels and the honeycomb cores increases the bond strength because the bonding area extends beyond the edges of the core material up the walls of the cells and partially onto the inner face of the panels (col. 1, lines 7-20 and 30-35). The adhesive may

comprise a thermoplastic material but preferably consists essentially of a thermosetting material (col. 2, lines 66-69).

The examiner argues that it would have been obvious to one of ordinary skill in the art to use in the McKown assembly the thermoplastic adhesives of Fell and Lynam instead of McKown's thermosetting adhesive in order to reduce the cycle time (answer, pages 6-7).

The examiner's argument is not well taken because McKown uses a specific adhesive to obtain particular processing and product characteristics, and the examiner has not explained why the applied references would have led one of ordinary skill in the art to forgo those characteristics in return for a shorter cycle time. McKown teaches that the requirements for structural adhesives "are particularly formidable, calling for an adhesive which exhibits excellent strength properties over a wide temperature range which in turn depends on attainment of a delicate balance of such properties as adhesion, toughness, and tensile strength" (col. 2, lines 17-25). McKown discloses desired overlap shear, T-peel, honeycomb peel and beam-creep properties (col. 2, lines 25-

49), and states that "[t]he achievement of such properties when bonding to honeycomb requires an adhesive that not only exhibits strength properties in the cured state, but that also, when first heated, has flow and other characteristics necessary to wet and form a fillet along the contacted edge portion of the honeycomb" (col. 2, lines 50-55). McKown also states that the adhesive provides a processing benefit as follows (col. 3, lines 34-61):

In the completely uncured state, the adhesive is a flowable particulate which can be readily removed from undesired areas by means of a vacuum tool. Upon subjection to temperatures above about 120° F. and below the cure temperature, the adhesive enters an agglomerated, fused state in which it adheres strongly to the substrate to which it is applied and yet is not tacky or sticky enough to cause individually treated substrates to stick together during storage or shipment. Moreover, in this state, the treated parts can be manipulated into the bonding position without the need for careful precautions to insure precise initial matching. The adhesive can remain in this fused adherable, non-tacky, curable state for extended periods of time at temperatures less than about 90° F.

Because of this stability in an adherable state, it is now possible for the manufacturer of the basic structural elements, e.g., the manufacturer of panels and honeycomb structures, to pre-coat such elements with the

adhesive, selectively remove adhesive from undesired areas, heat the adhesive to a fused, adhering state, and ship the resulting product to the ultimate fabricator such as the airplane manufacturer. Thus, the adhesive of this invention provides the opportunity for a form of marketing of structural units hitherto impossible with previous structural adhesives, giving the ultimate manufacturer the option of concentrating on the final assembling techniques to which it is best suited.

The examiner has not explained why one of ordinary skill in the art would have reasonably expected the thermoplastic adhesives of Fell and Lynam to provide the above properties and processing benefits of McKown's adhesive, or why the applied references would have led such a person to modify McKown's process such that these benefits are given up to obtain a shorter cycle time. The examiner, therefore, has not carried the burden of establishing a *prima facie* case of obviousness of the invention recited in any of appellants' claims.

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DECISION

The rejections under 35 U.S.C. § 103 of claims 11, 17 and 18 over McKown in view of Fell and Lynam, claims 15 and 16 over McKown in view of Fell, Lynam and Andresen, claim 19 over McKown in view of Fell, Lynam and either O'Connor or Goldsworthy, and claims 13, 14, 20 and 21 over McKown in view of Fell, Lynam and either Trnka or Wilson, are reversed.

REVERSED

TERRY J. OWENS)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
PAUL LIEBERMAN)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
PETER F. KRATZ)	
Administrative Patent Judge)	

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